EFFLUENT GUIDELINES AND RECEIVING WATER QUALITY OBJECTIVES FOR THE MINING INDUSTRY IN ONTARIO

1973

Ministry of the Environment
Ontario

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The "Mine-Mill Effluent Guidelines" presented in Table 1 represent the minimum degree of treatment that is necessary at existing and future mining operations in the Province of Ontario regardless of the available dilution in the receiving water. More stringent mine-mill effluent guidelines will be defined by the Ontario Ministry of the Environment for a specific mining property or for a specific mining area should such action be warranted.

Each new mining operation in the Province of Ontario will receive an individual set of mine-mill effluent guidelines from the Ontario Ministry of the Environment. Each set of mine-mill effluent guidelines will reflect as accurately as possible the environmental and other factors that influence the mining development in question.

Specific mine-mill effluent guidelines will be defined, on an individual basis, by the Ontario Ministry of the Environment for all existing mining operations. These guidelines will be influenced by local environmental and other considerations.

The "Mine-Mill Effluent Guidelines" of the Ontario Ministry of the Environment will be influenced by positive mine-mill waste treatment practices such as wastewater re-use.

The "Receiving Water Quality Objectives" presented in Table 2 take into consideration existing and potential uses of the receiving water.

The "Receiving Water Quality Objectives" will apply at the periphery of a mixing zone which will be defined for each mining operation on the basis of the hydrological, physical, chemical and biological characteristics of the receiving water.

The "General Water Quality Objectives" presented in Table 3 relate to the aesthetic quality of the receiving watercourse including the mixing zone.

TABLE 1

MINE-MILL EFFLUENT GUIDELINES

METALS

The total concentration of any individual metal* (excluding calcium, magnesium, potassium and sodium) in a mine-mill effluent should not exceed 1 milligram per litre (mg/litre) unless otherwise indicated by the Ontario Ministry of the Environment.

In addition, the cumulative concentration of copper, lead, zinc and nickel in a mine-mill effluent

should not exceed 1 milligram per litre.

* At any mine-mill location, cadmium and mercury should not be discharged in mine-mill effluents in concentrations that are in excess of natural cadmium and mercury background concentrations found in the immediate area of the mine-mill operation. In cases of extremely low concentrations, where chemical analysis is of questionable accuracy, a detection level agreed upon by the Ontario Ministry of the Environment and the company concerned will constitute background.

SUBSTANCES OF UNKNOWN TOXICITY

All mine-mill wastes containing materials such as flotation agents, chemical additives, etc., of unknown toxicity should be considered harmful until bioassay tests in keeping with the specifications of the Ontario Ministry of the Environment have shown otherwise.

SULPHATES AND TOTAL DISSOLVED SOLIDS

The policy of the Ontario Ministry of the Environment is to minimize the build-up of sulphates and total dissolved solids in Ontario's receiving waters.

Sulphate and total dissolved solids concentrations in mine-mill effluents should be kept as low as possible using the best available practicable technology.

AMMONIA

Ammonia concentrations in mine-mill effluents should be kept as low as the best available practicable

technology permits. Until the technology for the removal of ammonia from waste streams improves, the use of ammonia and/or ammonium-based compounds by the mining industry should be minimized whenever and wherever possible.

SUSPENDED SOLIDS

A mine-mill effluent should not contain more than 15 mg/litre of suspended solids.

OXYGEN DEMAND

The oxygen demand (chemical or biochemical) of a mine-mill effluent should be limited to a level which will not cause depression at any time of dissolved oxygen concentrations below 6 mg/litre in receiving waters supporting cold water fisheries and 5 mg/litre in receiving waters supporting warm water fisheries.

pH

The pH of a mine-mill effluent must be maintained within the range 5.5 to 10.6 at all times. The pH should never be permitted to drop below 5.5. Sudden changes in pH values should be avoided.

TABLE 2

RECEIVING WATER QUALITY OBJECTIVES

(mg/l)

PARAMETER		HARD WATER	SOFT WATER
Chromium	(dissolved)	0.5 (0.05)*	0.5 (0.05)*
Cobalt	(dissolved)	0.5	0.5
Copper	(dissolved)	0.07	0.03
Iron	(dissolved)	0.3	0.3
Lead	(dissolved)	0.1 (0.05)*	0.05
Nickel	(dissolved)	1.0	0.4
Zinc	(dissolved)	0.2	0.02
Cyanide	(dissolved)	0.01	0.01
Ammonia	(Ammonia Nitrogen as N)	1.5	1.5
Arsenic	(dissolved)	0.05	0.05

(*) Public Surface Water Supply Objective

NOTE #1

The objectives presented in Table 2 are intended to provide adequate protection of Fish and Aquatic life. Other water uses, such as potable water supplies, may necessitate the adoption of more stringent objectives for individual parameters.

It is not the intention that these concentrations be regarded as desirable levels in natural waters since, generally speaking, levels at or close to natural background levels must be considered most desirable. However, when not exceeded over limited areas of receiving waters in proximity to industrial discharges, these objectives should afford adequate protection to the aquatic biota under the

majority of naturally occurring environmental conditions. It should also be noted that these objectives will be reviewed routinely and are subject to change in light of new findings.

NOTE #2

In Table 2, soft water is designated as 100 mg/litre hardness as $CaCO_3$ or less. Hard water is designated as greater than 100 mg/litre hardness as $CaCO_3$. Both definitions refer to natural water hardness. Almost all hardrock mines in the Province of Ontario are located in areas that fall in the "soft water" category.

NOTE #3

Where the natural background concentration in the receiving watercourse exceeds the value given for any parameter in Table 2, the natural background concentration will become the receiving water quality objective.

TABLE 3

GENERAL WATER QUALITY OBJECTIVES

OIL

Oil, petrochemicals or other immiscible substances that will cause visible films or toxic, noxious or nuisance conditions should not be added to water.

COLOUR AND TRANSPARENCY

For effective photosynthetic production of oxygen, it is required that 10 per cent of the incident light reach the bottom of any desired photosynthetic zone in which adequate dissolved oxygen concentrations are to be maintained.

FLOATING MATERIALS

All floating materials, other than those of natural origin, should be excluded from streams and lakes.

TAINTING SUBSTANCES

All materials that will impart odour or taste to fish or edible invertebrates should be excluded from receiving waters at levels that produce tainting.

NUTRIENTS

It is the policy of the Ontario Ministry of the Environment to discourage or minimize the discharge of substances which may promote excess plant growth in a receiving watercourse.